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First records of three genera of Metopiinae (Hymenoptera, Ichneumonidae) from South Korea with description of one new species

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ABSTRACT

Triece koreanus Choi & Lee, sp. nov. is described and illustrated in the South Korean fauna. The genera *Periope*, *Stethoncus*, and *Triece* are recorded for the first time from South Korea. Description with photographs of the new species and diagnoses for each species are provided.

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Introduction

Metopiinae Förster, 1869 is a moderately large ichneumonid group comprising more than 830 described species worldwide. According to Baltazar (1964), the group consists of koinobiont endoparasitoids in pyraloids and tortricoids of lepidopterous larvae, which emerge from the pupae of their hosts. The genus *Triece* Townes, 1946 comprises 69 species (Tolkanitz 2010; Yu et al 2012; Zhang et al 2016), including the newly described species, *Triece etuokensis* Sheng, 2016, from China by Zhang et al (2016). Also, the genera *Periope* Haliday, 1838 and *Stethoncus* Townes & Townes, 1959 comprise only 5 species worldwide (Yu et al 2012). The genera *Periope*, *Stethoncus*, and *Triece* have not been studied yet in South Korea. Three genera of South Korean Metopiinae are discussed here: *Periope* with one species, *Stethoncus* with one species, and *Triece* with three species (one of them new to science).

In this study, we report a new species and four newly recorded species from South Korea.

Materials and methods

Materials used in this study were collected by sweeping and Malaise trapping, after which they were deposited in the animal systematic laboratory of Yeungnam University (YNU, Gyeongsan, South Korea). Morphological terminology follows mostly that of Gauld et al (2002). Specimens were examined using an AxioCam MRC5 camera attached to a stereomicroscope (Zeiss SteREO Discovery. V20; Carl Zeiss, Göttingen, Germany), processed using AxioVision SE64 software (Carl Zeiss), and optimized using a Delta imaging system (i-solution; IMT i-Solution Inc., Vancouver, Canada). Distributional data mainly follow that of Yu et al (2012). Species description and diagnoses are based on South Korean specimens.

Abbreviations are as follows: GN, Gyeongsangnam-do; GG, Gyeonggi-do. AEI, American Entomological Institute, Gainesville, FL, USA (H. Townes collection); HU, Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan; MZ, Musée Zoologique, Place Riponne, Switzerland; TMA, Termesztudományi Múzeum Allattara, Budapest, Hungary.

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Systematic accounts

Family Ichneumonidae Latreille, 1802

Subfamily Metopiinae Förster, 1869

Genus *Periope* Haliday, 1838

Periope Haliday, 1838: 112–121. Type species: *Periope auscultator* Haliday.

Monoplectron Holmgren, 1856: 1–104. Type species: *Monoplectron zygaenator* Holmgren.

Oligoplectron Förster, 1869: 135–221. Type species: *Periope auscultator* Haliday. New name for primary homonym.

Monoplectrochus Heinrich, 1949: 101–127. Type species: *Monoplectrochus hoerhammeri* Heinrich

Periope hoerhammeri (Heinrich, 1949)

Monoplectrochus hoerhammeri Heinrich, 1949: 101–127. Type: male; Type depository: AEL.

Diagnosis. Color. Black. Labrum, palpi, projection of upper face, fore and mid legs except basal coxae, spots on dorsal femora of fore

and mid legs, hind trochanter and tibia except apically, hind tarsi and tegula yellow (Figures 1A and 1B). Antenna except scape and first flagellomere brown.

Face rugosely punctate. Malar space granulate, shorter than basal width of mandible. Projection of upper face recurved. Vertex densely punctate. Antenna with at least 21 flagellomeres. Pronotum polished, with hairs. Scutellum convex. Epicnemial carina incomplete; mesopleuron densely punctate; speculum shiny (Figure 1C). Metapleuron slightly punctate. Propodeum with parallel median longitudinal carinae (Figure 1D). Fore wing with stalked areolet (Figure 1E). Hind wing with nine distal hamuli. Tergites coarsely punctate; first tergite with lateral carinae at anterior half of first tergite in lateral view.

Material examined. South Korea: [GG] 1♂, Bokwangsa, 1 v 1984 (JW Lee).

Distribution. South Korea (new record), Japan, Germany, Lithuania, Poland, Russia (Primor'ye Kray), Ukraine.

Genus *Stethoncus* Townes & Townes, 1959

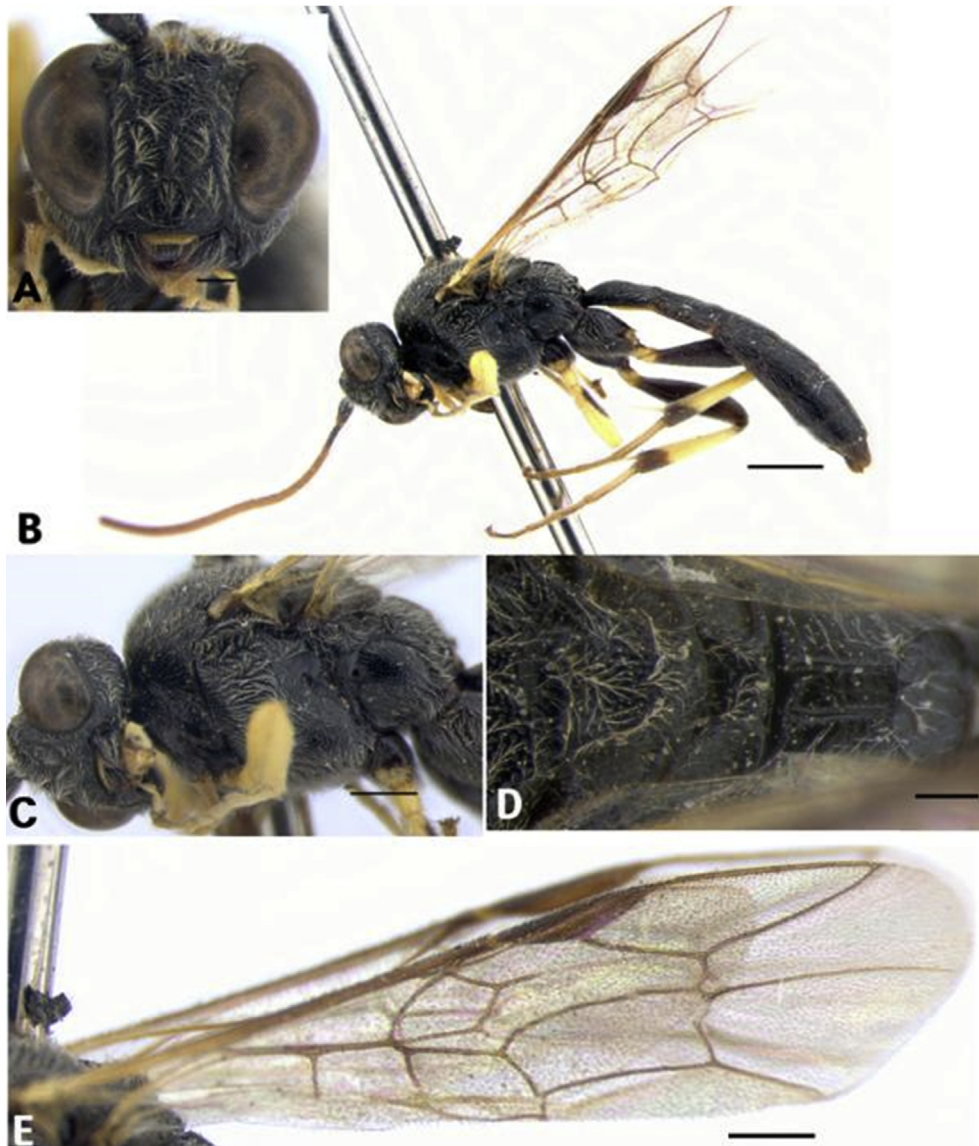


Figure 1. *Periope hoerhammeri*. A, Head, frontal view; B, Habitus, lateral view; C, Head and mesosoma, lateral view; D, Propodeum, dorsal view; E, Fore wing. <scale bars: 0.2 mm (A, D); 0.5 mm (C, E); 1 mm (B)>

Stethoncus Townes & Townes, 1959: 167. Type species: *Stethoncus arcticus* Townes & Townes.

***Stethoncus sulcator* Aubert, 1963**

Stethoncus sulcator Aubert, 1963: 82–86. Type: male; Type depository: MZ.

Diagnosis. Color: Black. Palpi, mandible, antenna, tegula and legs yellowish brown; hind coxa darkened (Figures 2A and 2B).

Face coarsely and sparsely punctate; projection of upper face 90° recurved. Frons convex, sparsely punctate (Figure 2B). Malar space longer than basal width of mandible. Occipital carina indistinct; occiput sunken. Pronotum sunken and glabrous except upper area (Figure 2C). Mesopleuron swollen, shiny, and sparsely punctate. Mesoscutum sparsely punctate, with notauli (Figure 2D). Scutellum

elongate and polished, without lateral carina. Propodeum well-developed carinae (Figure 2E); propodeal spiracle round, reach pleural carina. Metapleuron glabrous. Fore wing without areolet. Hind wing with five distal hamuli. Legs stout. Tergites shiny and impunctate; first tergite with median longitudinal carinae.

Material examined. South Korea: [GN] 1♂, Sancheong-gun, Sicheon-myeon, Naedae-ri Jirisan National Park, Saeseoksanjang, 12 × 2001 (JW Lee).

Distribution. South Korea (new record), Austria, Bulgaria, France, Germany, Japan, Poland, Russia (Buryatskaya Respublika, Krasnodar Kray), Switzerland, Ukraine.

Genus *Trieces* Townes, 1946

Trieces Townes, 1946: 60. Type species: *Exochus texanus* Cresson.

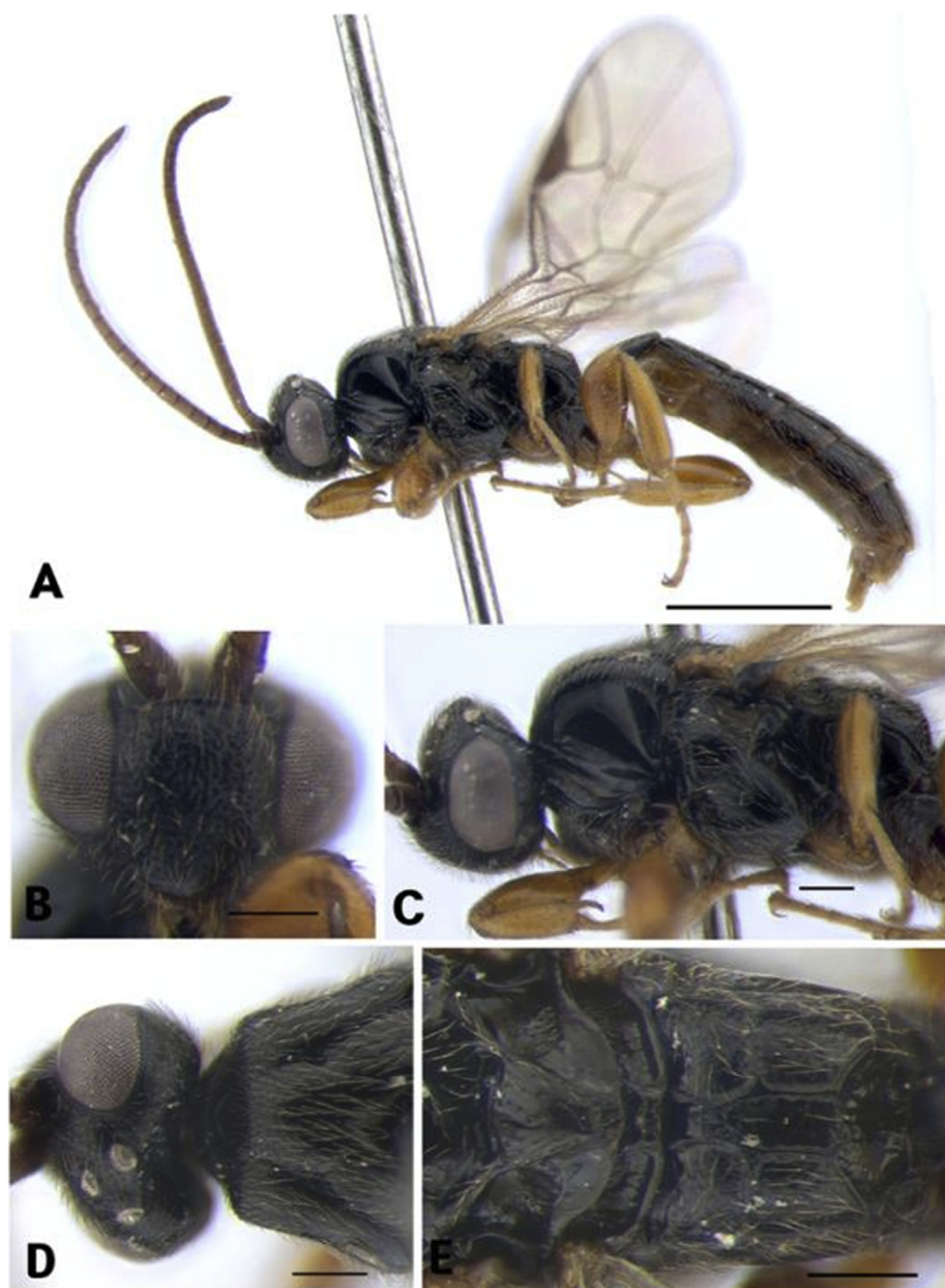


Figure 2. *Stethoncus sulcator*. A, Habitus, lateral view; B, Head, frontal view; C, Head and mesosoma, lateral view; D, Head and mesoscutum, dorsal view; E, Scutellum and propodeum, dorsal view. <scale bars: 0.2 mm (B, C, D, E); 1 mm (A)>

Key to species of South Korean *Trypoxys*

1. Metapleuron with vertical slit-shaped depression posteriorly. Occipital carina present.....2
 - Metapleuron without vertical slit-shaped depression posteriorly. Occipital carina absent.....*T. bellulus* Kusigemati
2. Head not widened posteriorly behind eyes in dorsal view. Temple not convex, shorter than transverse eye diameter in lateral view. Face yellowish brown (Figure 4B). Antenna with less than 24 flagellomeres.....*T. homonae* Kusigemati
 - Head widened posteriorly behind eyes in dorsal view. Temple convex, longer than transverse eye diameter in lateral view. Face black with yellow projection (Figure 4B). Antenna with 33 flagellomeres.....*T. koreanus* Choi & Lee sp. nov.

***Trypoxys bellulus* Kusigemati, 1984**

Trypoxys bellulus Kusigemati, 1984: 245–263. Type: female; Type depository: TMA.

Diagnosis. Color. Black. Face, clypeus, palpi, ventral part of antenna, tegula, fore and mid legs, hind leg except coxa and femur, and ovipositor yellowish brown; hind coxa dark reddish brown; hind femur brown (Figures 3A and 3B).

Face sparsely punctate. Antenna with 21 flagellomeres. Mandible granulate. Malar space shorter than basal width of mandible. Frons shiny without median longitudinal ridge. Occipital carina absent.

Pronotum glabrous, upper corner of pronotum sparsely punctate (Figure 3C). Mesopleuron sparsely punctate anteriorly; speculum area glabrous and flat, without pit (Figure 3C). Mesoscutum convex, without notaulus (Figure 3D). Metapleuron shiny; lower and posterior area of metapleuron with transverse wrinkles; without vertical slit-shaped depression posteriorly. Scutellum elongate, with lateral carinae. Propodeum rugosely punctate. Fore wing without areolet (Figure 3F). Hind wing with six distal hamuli. Legs stout. First to third tergites rugosely punctate; first to basal half of third tergites with lateral carinae in lateral view. Second to half of third tergites with median longitudinal carinae distinctly in dorsal view (Figure 3E). Fourth to seventh tergites finely punctate.

Material examined. South Korea: 1♀, Daegu-si, Dalseo-gu, Daegok-dong, Daegu Arboretum, alt. 88 m, 22–23 viii 2012 (SG Kang).

Distribution. South Korea (new record), Mongolia, Russia (Chita Oblast, Kamchatka Oblast, Primor'ye Kray, Tuvinskaya Respublika).

***Trypoxys homonae* Kusigemati, 1967**

Trypoxys homonae Kusigemati, 1967: 45–49. Type: female; Type depository: HU.

Diagnosis. Color. Black. Face, scape, palpi, fore and mid legs and tegula yellowish brown to brown (Figures 4B and 4C). Antenna brown. Hind leg brown to dark brown; hind coxa darkened basally (Figure 4A).

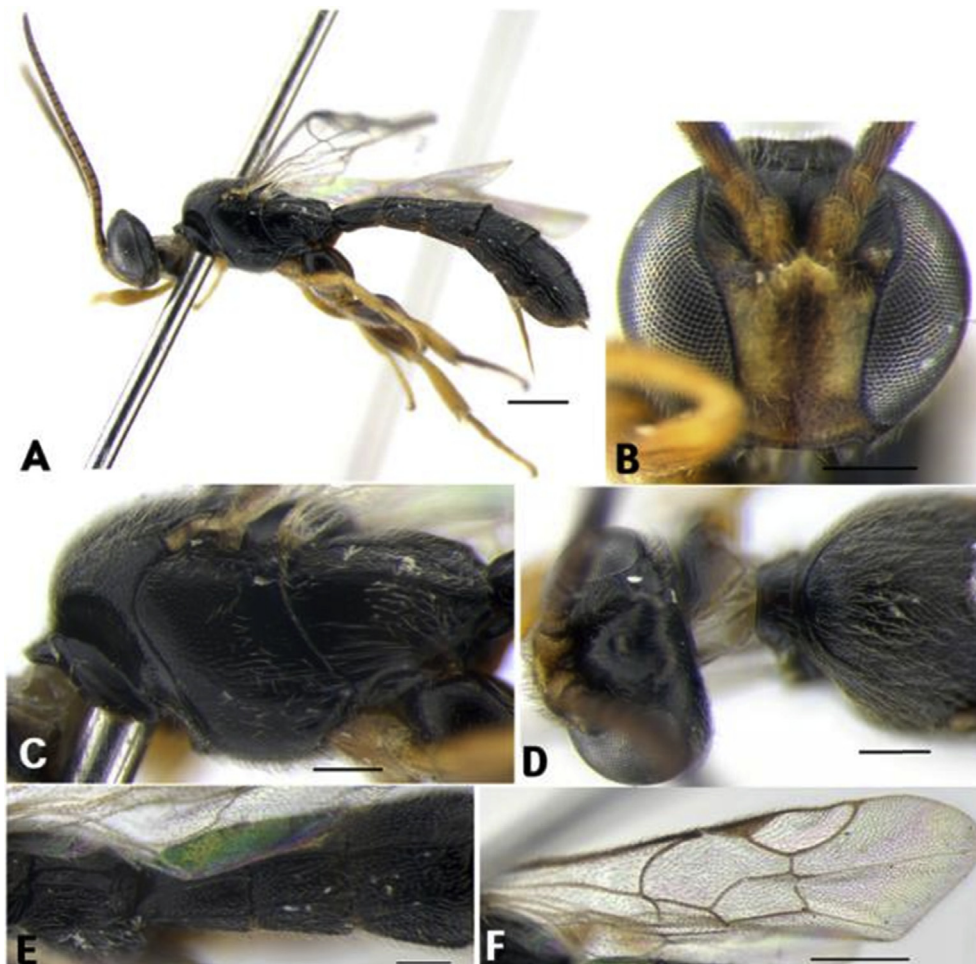


Figure 3. *Trypoxys bellulus*. A, Habitus, lateral view; B, Head, frontal view; C, Mesosoma, lateral view; D, Head and mesoscutum, dorsal view; E, Propodeum and basal tergites, dorsal view; F, Fore wing. <scale bars: 0.2 mm (B, C, D, E); 0.5 mm (A, F)>.

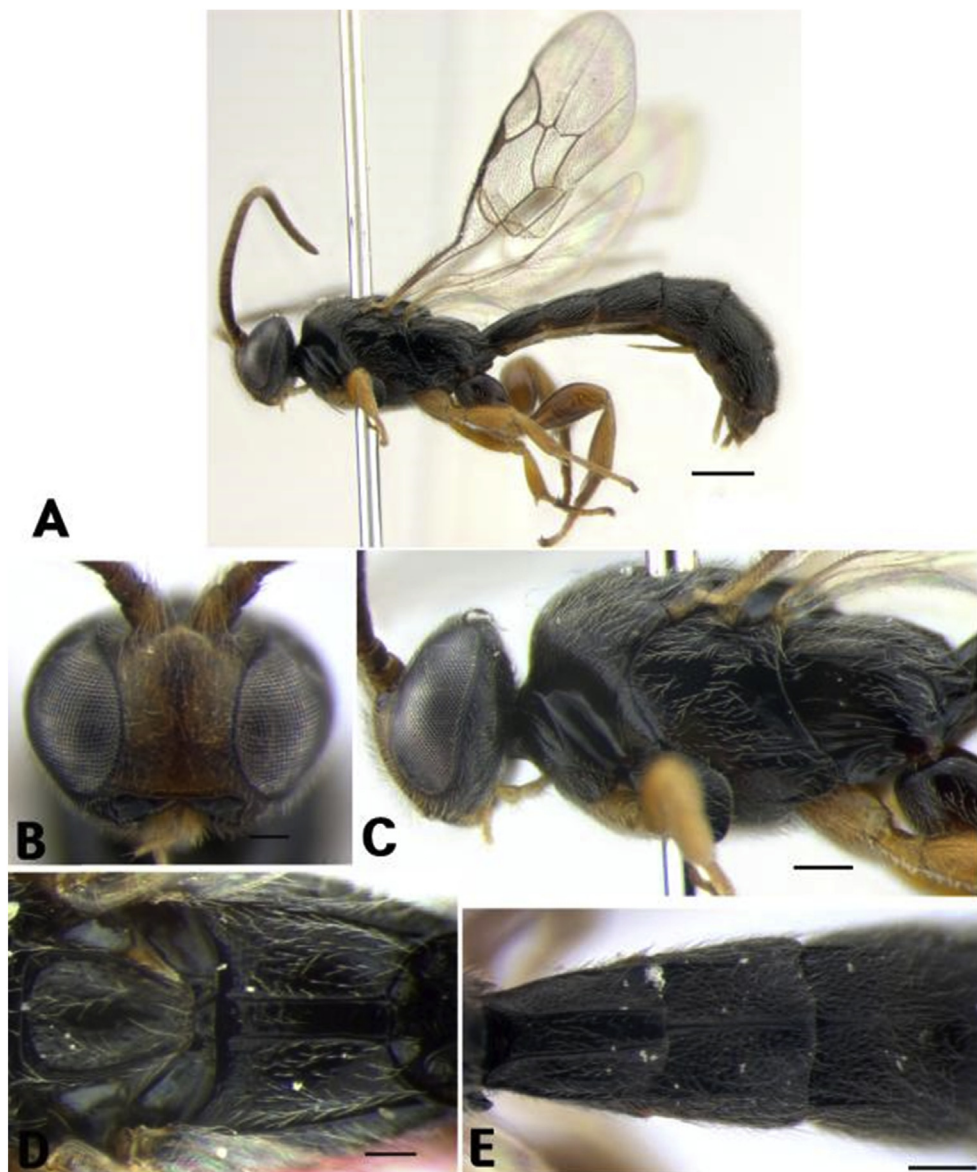


Figure 4. *Trieses homonae*. A, Habitus, lateral view; B, Head, frontal view; C, Head and mesosoma, lateral view; D, Head and mesoscutum, dorsal view; E, Propodeum and tergites, dorsal view; F, Wings. <scale bars: 0.1 mm (B, D); 0.2 mm (C, E); 0.5 mm (A)>

Face sparsely punctate. Head not widened posteriorly behind eyes in dorsal view. Antenna with 24 flagellomeres; pedicel as long as scape. Mandible glabrous except basal area granulate. Malar space shorter than basal width of mandible. Frons shiny without median longitudinal ridge. Temple not convex, shorter than transverse eye diameter in lateral view. Occipital carina complete. Pronotum glabrous (Figure 4C), upper corner of pronotum closely punctate. Mesopleuron densely punctate anteriorly; speculum area flat, without pit. Mesoscutum convex, without notaulus. Metapleuron shiny, with hairs on upper area; lower area of metapleuron with transverse wrinkles; with vertical slit-shaped depression posteriorly. Scutellum elongate, with lateral carinae. Propodeum with parallel median longitudinal carinae, without costula (Figure 4D). Fore wing without areolet (Figure 4A). Hind wing with six distal hamuli. Legs stout. Metasoma finely and densely punctate. First tergite with median longitudinal carinae distinctly in dorsal view (Figure 4E). Second to third tergites with median longitudinal carina; first to third tergites with lateral carinae distinctly in lateral view.

Material examined. South Korea: [GG] 2♀♀, Osan-si, Sucheon-dong, Mulhyanggi Arboretum, alt. 38 m, 16 iv–31 viii 2012 (YD Kwon & YM Ji).

Distribution. South Korea (new record), Japan, Russia (Primor'ye Kray).

***Trieses koreanus* Choi & Lee, sp. nov.**

LSID: urn:lsid:zoobank.org:act:1D49B4D2-9317-4E35-ABBF-6F430D6291F6

Type. Holotype: male; Type depository: YNU. South Korea: Seoul, Korea University, Imeupsisukwan A, 24 vi 1987 (JW Lee).

Description. Holotype: male.

Color. Black. Palpi and projection of upper face pale yellow (Figure 5B). Fore and mid legs yellowish brown. Hind tibia and tarsi brown (Figure 5A).

Head. Inner margins of eyes distinctly convergent downward. Head widened posteriorly behind eyes in dorsal view. Face with weak sparse punctures, distance between punctures approximately as long as diameter of punctures. Apical margin of clypeus almost

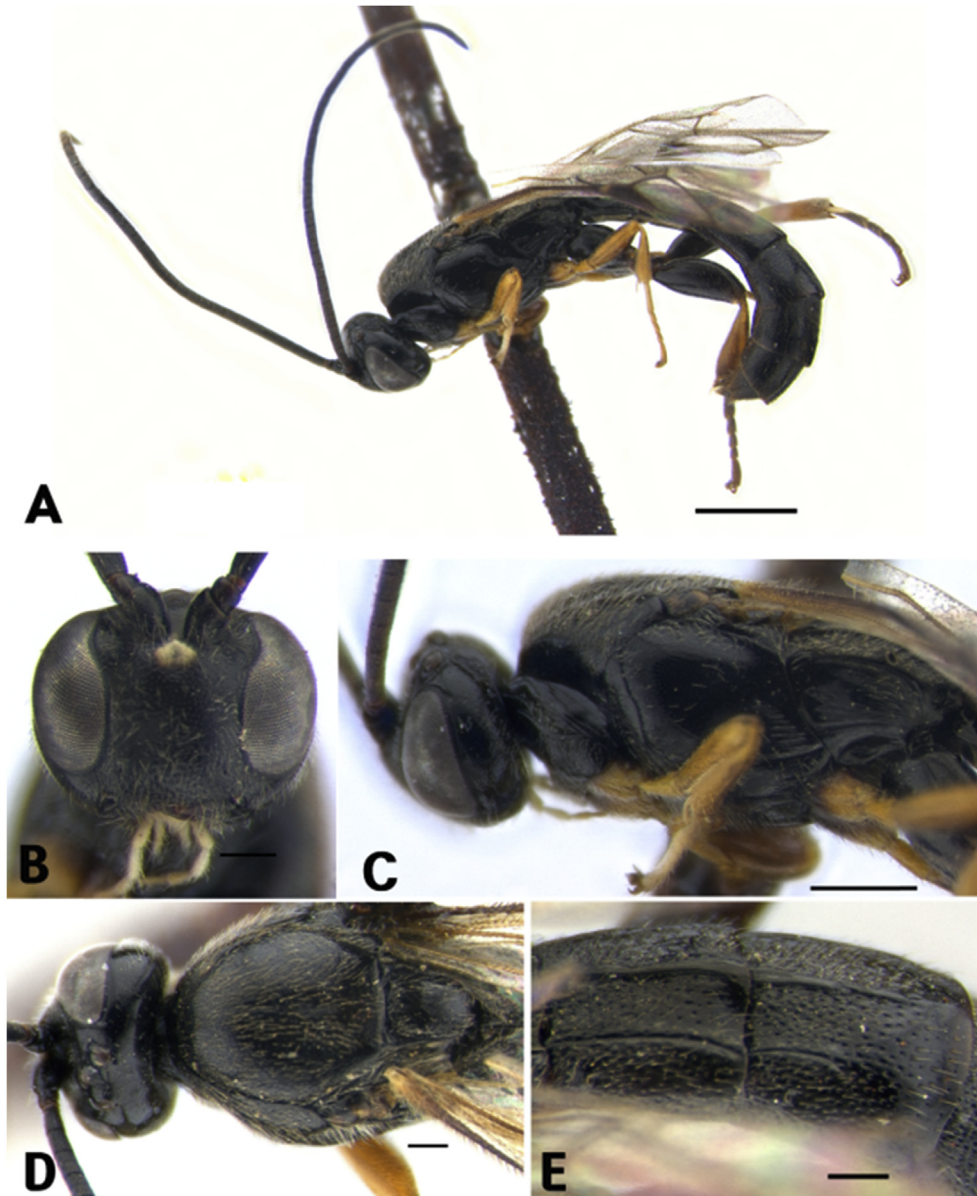


Figure 5. *Trieses koreanus* Choi & Lee sp. nov. A, Habitus, lateral view; B, Head, frontal view; C, Head and mesosoma, lateral view; D, Head and mesoscutum, dorsal view; E, Second and third tergites, dorsolateral view. <scale bars: 0.2 mm (B, D, E); 0.5 mm (C); 1 mm (A)>

truncate. Mandible small, weakly narrowed toward apex; upper tooth distinctly longer than lower tooth. Malar space approximately as long as basal width of mandible. Temple convex and shiny, with sparse and indistinct punctures; longer than transverse eye diameter in lateral view. Vertex and frons almost shiny, with indistinct sparse punctures. Frons flat. Antenna slightly longer than head and mesosoma combined, with 33 flagellomeres; each flagellomere longer than wide. First flagellomere 1.9 times as long as maximum width, approximately as long as third flagellomere. Occipital carina complete.

Mesosoma. Pronotum smooth and shiny, upper-posterior portion with dense shallow punctures and hairs (Figure 5C). Epomia indistinct. Mesoscutum with dense distinct fine punctures, posterior flat. Notaulus absent (Figure 5D). Scutellum weakly convex, with sparse, indistinct punctures; lateral carina reaching apex. Mesopleuron fovea vestigial; lower posterior portion with transverse wrinkles. Upper end of epicnemial carina reaching anterior margin of

mesopleuron. Metapleuron almost flat, shiny, posterodorsal portion with few hairs, lower posterior portion with distinct wrinkles; with vertical slit-shaped depression posteriorly. Juxtacoxal carina strong. Wings slightly hyaline. Fore wing without areolet. Vein *Cu-a* distal of *Rs+M*. Vein *cu-a* of hind wing incomplete. Hind wing with five distal hamuli. Hind tibia gradually widened apically. Posterior spur of hind tibia approximately 2.7 times as long as anterior spur. Ratio of length of hind tarsomeres 33:15:12:10:20. Propodeum with strong apical transverse and lateromedian longitudinal carinae. Propodeal spiracle large and circular, fused pleural carina.

Metasoma. First tergite approximately 1.7 times as long as apical width, with dense punctures; median dorsal, dorsolateral, ventrolateral, and sublateral longitudinal carinae complete. Second tergite densely punctate, median and sublateral carinae complete (Figure 5E). Third tergite with median longitudinal carina until basal 0.7; basal 0.5 with lateral longitudinal carinae. Basal half of fourth tergite densely punctate.

Distribution. South Korea.

Etymology. The specific name is derived from the holotype locality.

Remarks. This new species is similar to *T. homonae* Kusigemati and can be distinguished from the latter by the following combination of characters: antenna slightly longer than head and mesosoma combined, with 33 flagellomeres; head widened posteriorly behind eyes in dorsal view; temple convex, longer than transverse eye diameter in lateral view; face black with yellow projection.

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